1395. a. 25.

A
LETTER

Moſt humbly addreſſed to

DOCTOR MASKELYNE,

Aſtronomer Royal, & F. R. S.

ON THE DISCOVERY OF A NEW

REFLECTING TELESCOPE.

By SAMUEL FRANCIS, Philomath.

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INTRODUCTION.

IT muſt be acknowledged by all rational Men, that, to uſe the utmoſt exertions for the Improvement of Aſtronomy and Navigation, is one of the moſt excellent Services which an Individual can render to the Human Race. And I doubt not, but, that ~~in~~ a few months will convince the World, that I ſhall Merit to be numbered among the leading Characters who have contributed towards this great end.

REVEREND SIR,

IT is the opinion of poor ingenious Men, "That Fortune has placed you, Sir, in that ſtation which renders you an Aſylum for them to flee to for your approbation, or otherwiſe.

And I having often heard from the mouths of Mr. Charles Maſon, Mr. Jeremiah Dixon, and Mr. Steel, inſtances of your philanthropy; it is not to be wondered at, that I ſhould make my appeal, by laying before you, Sir, the Invention of a NEW REFLECTING TELESCOPE. But firſt I muſt beg to mention a few particulars:

1ſt. Every perſon who knows the properties of a Convex Lens, knows, that when the *Concavity of the Object or IMAGE* is equal to the Convex ſurface of the Lens oppoſed

oppoſed to it. That then, and then only, the Optic Angle; Brightneſs of the Picture; Diſtinctneſs of the Viſion; Magnifying Power and Field of View, are all maximums! For then both Averrations are deſtroyed: The diſtance of every point of the Object, being equal, from its correſpondent incident point of the Lens.

This any child of three years of age can occularly demonſtrate! by preſſing Lawn, or any thin ſubſtance into ſoft Wax, with any Lens; then raiſing the Lens to its focal diſtance, the diſtinctneſs, &c. will be the ſame throughout the whole field of View. Whether the angle of the emergent Cone of Rays, be coincident with the Focal Point of the Cryſtalline Humour or not! But the maximums are when the Compound Focus of the Lens and Cryſtalline fall at *half* the Focus of the Cryſtalline.

2ndly, It is alſo well known, that, "It is poſſible to produce an Object Metal, which ſhall reflect parallel Rays, to nearly a Geometrical point in its axis; and by as Geometrical means as that of the Sphere. And it gives me pleaſure that I know of four ways of doing it!

3rdly, Rays iſſuing from the aforeſaid point, which is now to be looked on as the the Focus of a certain Curve in a diverging ſtate, will be reflected to its other Focus; and *will form the Image* of the deſired Concavity; agreeable to the firſt Article.

Which is nearly ſimilar to Des Carteſ's fourth Oval 4A4 : 4Z4. As alſo to that of the Ellipſis; but much more perfect.

4thly, In my opinion, it is abſurd to leave out the beſt part of a middling Metal: and much more ſo, that of a good one. I, therefore, make mine nearly whole, and inclines

clines it a little to one ſide. As I ſince find you, Sir, did your Newtonian, about the year 1787. And I am extremely happy *in your ſaying* that it was " then incomparably better."

CONSTRUCTION.

The bold lines repreſent the Sides of the Tube. OB the Object Metal, a little inclined, ſo that the Image may be formed near the mouth of the Tube, at its Side.

Mirror

Reflector

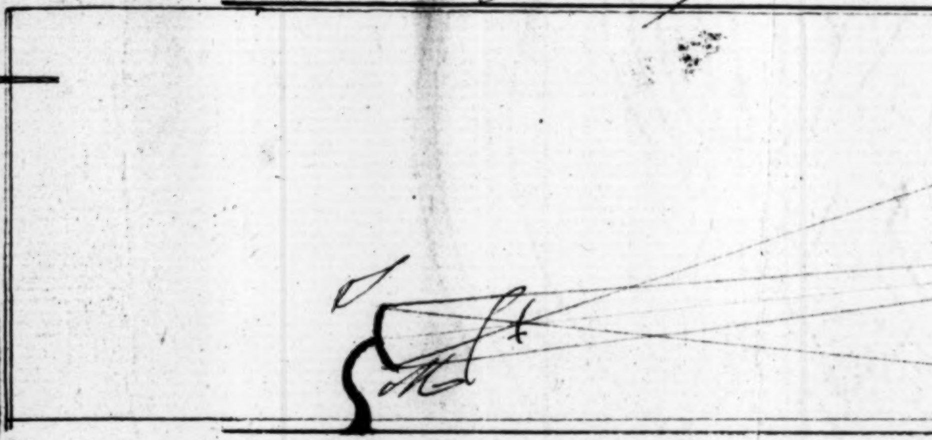
2ndly, Then place the ſmall Concave Metal at its Focal diſtance from the Image of the great Metal, in the axis of the great Metal, ſo that its Image may be formed near the Center of the great Metal, to be viewed with the Eye-Glaſs in the Drawer.

3dly, I make uſe of the Drawer, for Objects under 45°. altitude. But the plane Speculum for thoſe above 45° to the Zenith.

This

e Francisian Reflector as Invented

A Journeyman



here OB is the Object Metal & its Fo

he Image viewed by the Eye with the Eye

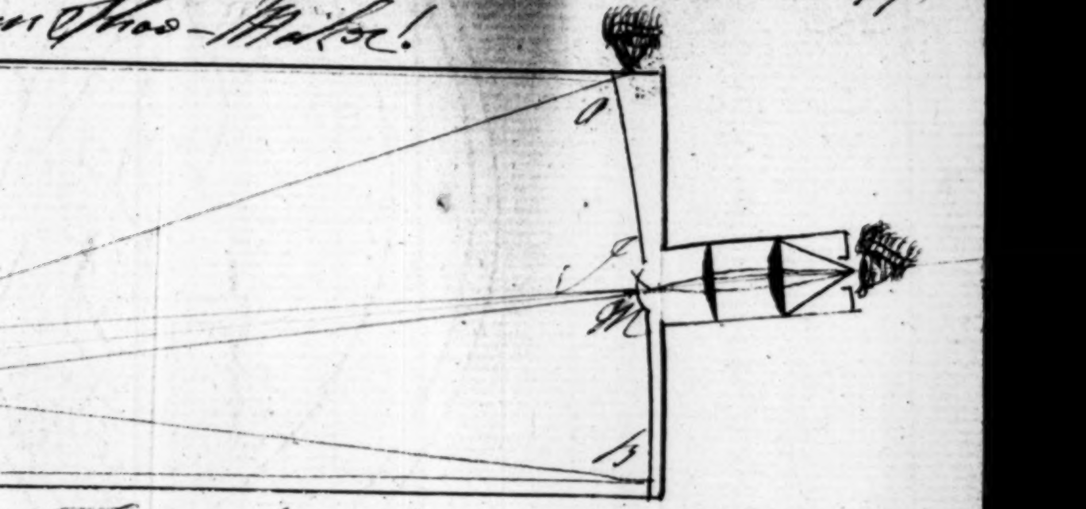
reat Metal is about 20 of an Inch.

which I delivered to Mr [illegible] Ram

n that was placed near the Side of a

Metal.

nted by Samuel Francis Sep. 10. 1799
er Shoe-Maker!



t Focus; i M the Small Metal, E E
Eye Glasses, in the Eye Piece. The hole in the
l. This drawing is different from that
Ramsden F.R.S. the 19 Oct. 1799. by the Eye
e of the Scale near the Edge of the great

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This is the Franciſian Reflector.

I ſhould eſteem it a particnlar favour, would you, Sir, lay before the Public your Opinion of the Principle of *this Inſtrument*! Whether it be not preferable to any yet made Public, for an Obſervatory Inſtrument." The Focus of the Great Metal to be 6 feet.

1ſt. P. S. I ſuppoſe that I ſhall be often under the neceſſity of calling on you, Sir, and Doctor Hutton, for Information; " Whether Parabolic, Elliptic, Hyperbolic, and Des Cartes's Eye-Glaſſes, are not preferable to thoſe of the Sphere." As I have the Drawings of a dozen of different Reflecting Teleſcopes already by me; and that my Laths, Pedeſtal, and Optic Tools are completed, for the Inſpection of any Nobleman or Gentlemen of the Legiſlature.

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tions

ture. As I have made the Optic Science my Study (the few moments I could *Snatch*) for near Twenty Years, in order to improve the Commerce of my Country, and to bleſs Mankind! And I hope the Gentlemen Opticians, will *ſell* an Hundred Thouſand Pounds Sterling worth, Annually! to the *Great* of the India's; Inſtruments, of my Conſtruction!

2nd P. S. I have, in Idea, ſeveral Inſtruments, which will tend to the Improvement of Aſtronomy and Navigation; as they will be applicable by *Land and Sea*.

A CATALOGUE OF INSTRUMENTS, MADE AND SOLD BY S. FRANCIS, No. 5, Old Cavendiſh-Street, Cavendiſh-Square.

A new invented Braſs Perſpective Teleſcope: with an Opake and Tranſparent Single Microſcope, 1l. 1s.

An excellent Compound Microſcope, for the Pocket, with ſliders of Objects, &c. 1l. 1s.

A great Variety of Magnifiers, according to the Optic Science!

Microſcope Object Cuttings of different Woods, Shrubs, Plants, &c. Prepared after the great Cuſtance's manner. Exceeding good and cheap.

Spectacles, ſuperior to any that was ever offered to the Public.

Mechanics ſuited to the utmoſt perfection, agreeable to their reſpective Profeſſions; as I have experienced the diſagreeable conſequences which attend an improper Choice.

An Addreſs to the Gentlemen Opticians.

Gentlemen,

I ſhall make it my Study to promote your *Intereſt and Happineſs*, as long as I live: and nothing but the moſt ſincere Friendſhip will ever exiſt with me, towards you. In my Letter to a Gentleman, who knows you all; and whom you all know and reſpect, ſaid I, "There is not a Maſter or a Journeyman of your Trade, but what will accompany my Corpſe to the Grave!" Which evidently ſhews that my conduct muſt be very *ſingular*, to merit your attendance, out of a pure affection for the ſervices done.

Gentlemen,
Your's, &c.
S. FRANCIS.

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